Airline Fuel Conservation Equals Reduced Emissions NASA Environmental Compatibility Research Workshop March 17, 1998

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Summary

- Fuel Consumption & Emissions
- Fuel Conservation Initiatives
- CNS/ATM

Fuel Consumption & Emissions

Each Pound of Fuel Burned Results in:

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\sim 3.19 \, lb \, CO_2
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$$\sim 1.70 \text{ lb} \quad H_2O$$

 $\sim 0.015 \, lb \, NO_x$

~ 0.002 lb HC

Fuel Conservation Initiatives

Fuel is an Airline's 2nd Largest Expense

- Delta Statistics:
 - 12.7% of Total Expenses
 - FY'97: \$1.723 Billion
 - 7.12 Million Gallons per Day, or
 - 47.70 Million Pounds per Day

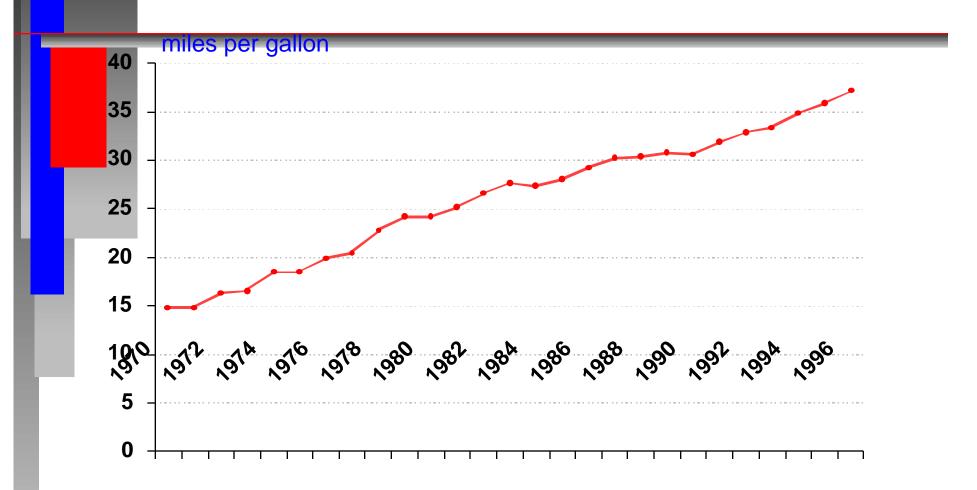
Fuel Conservation Initiatives

Annual Savings, millions lbs:

•	Single	<i>Engine</i>	Taxi	65.5
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- Payload Estimation 19.6
- APU Usage 7.5
- 70 Deg. Pushback 7.6
- Acceleration Altitude 6.9
- *GSE* at *MIA* 5.2
- Fueling Procedures 10.3
- Many More.....

Steadily Increasing Fuel Efficiency Passenger Miles per Gallon of Fuel



Fuel Conservation Initiatives

A Continuing Process

- Safety
- Customer Service
- Efficiency

The Center for Advanced Aviation Systems Development of The MITRE Corp. August 1997 Report Estimates that Enhanced CNS/ATM Has Potential to Save Emissions:

- 17% North America
- 12% Worldwide

What is CNS/ATM - FreeFlight?

A Worldwide State-of-the-Art
Improvement in Infrastructure

- ATC Tools
- Airplane Improvements
- New Procedures

ATC Tools

- URET User Response Evaluation Tool
- TATCA Terminal ATC Automation
 - CTAS Center Terminal Radar Approach
 Control Automation System
 - CRDA Converging Runway Decision Aid
- CPDLC Controller/Pilot DataLink Communication

Airplane Improvements

- GPS Navigation Global Positioning System
- RVSM Reduced Vertical Separation Minima
- CDTI Cockpit Display of Traffic Information

New Procedures

- NRP National Route Program
- Cruise Climb

Benefits Summary - North America & Oceanic Airspace

Savings, Millions of Pounds per Year

	Fuel	CO_2	NO_x	H_2O	HC
CDTI	151	483	2	177	0
NRP	1,316	4,197	20	1,539	3
RVSM	2,372	7,566	36	2,775	5
Datalink	2,290	7,305	34	2,679	5
URET	335	1,069	5	392	1
TATCA	590	1,882	9	690	1

Summary

Fuel Conservation Has Large Business Leverage

Fuel Conservation Equals Emissions Savings